

NON-PUBLIC?: N  
ACCESSION #: 9306280072  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: PILGRIM NUCLEAR POWER STATION PAGE: 1 OF 7

DOCKET NUMBER: 05000293

TITLE: Start Up Transformer Became De-energized During Testing  
While Shut Down  
EVENT DATE: 05/19/93 LER #: 93-010-00 REPORT DATE: 06/18/93

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Robert A. Gay - Senior Compliance TELEPHONE: (508) 747-8047  
Engineer

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

On May 19, 1993, at 1328 hours, the Start Up Transformer (SUT) became de-energized during a planned calibration of turbine/generator relays, lockout test and associated annunciator verification while the plant was shutdown. The Start Up Transformer lockout relay was actuated instead of the Main Transformer lockout relay. The de-energization of the SUT resulted in designed responses including automatic actuations of the Reactor Protection System, Primary and Secondary Containment Isolation Control Systems and Emergency Diesel Generators. The Start Up Transformer was re-energized by 1421 hours.

The root cause of the event was utility non-licensed Electric Lab Engineer error. The engineer mistakenly actuated the wrong relay while implementing the test procedure. Corrective action taken included an immediate discussion with electrical maintenance personnel on attention

to detail and self-checking. Preventive action planned includes review of the procedure for improvement to preclude recurrence.

The event occurred while shut down in a refueling outage. The Reactor Vessel (RV) head was installed. The reactor mode selector switch was in the SHUTDOWN position. There was no movement of a fuel assembly or fuel cask at the time of the event. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv). This event posed no threat to the public health and safety.

END OF ABSTRACT

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## BACKGROUND

The Auxiliary Power Distribution System (APDS) consists of six 4160 VAC buses. The APDS is divided into emergency service (Buses A5 and A6) and normal service (Buses A1, A2, A3, A4). Buses A5 and A6 supply power to essential loads required during normal operations and abnormal operational transients or accidents. Buses A1, A2, A3, A4 supply power to other station auxiliaries during planned operations. Power is distributed to the six 4160 VAC buses during normal operation from either the unit source (Unit Auxiliary Transformer) or the preferred offsite source (Start Up Transformer). The preferred power source is used to supply the 4160 VAC buses during normal startup and shutdown. After the main generator has been synchronized to the 345 kV transmission system, the 4160 buses are transferred from the preferred power source to the unit power source. The 4160 VAC emergency service Buses A5 and A6 can also be supplied from the standby power source (EDG 'A' and 'B') or the secondary power source (Shutdown Transformer).

During conditions when neither the UAT nor the SUT are available, the emergency diesel generators are designed to power emergency Buses A5 and A6. If the diesel generators fail to pick up the emergency buses, the Shutdown Transformer is designed to automatically power Bus A5 and A6 after a 12 second time delay. The station blackout diesel generator may be started to power Bus A5 or Bus A6.

Non-safety related 4160 V Buses A1, A2, A3, and A4 are designated normal service system buses. These buses power loads necessary for normal plant startup, operation, and shut down. These buses can be powered only by the UAT or SUT.

4160 V buses A1, A3, and A5 are located in the Turbine Building Switchgear Room 'A'. Buses A2, A4, and A6 are located in Switchgear Room

'B'.

Just prior to the event, plant system status was:

- o The reactor mode selector switch was in the REFUEL position. The control rods were fully inserted for the core locations where fuel was installed. The RV head was installed with RV pressure at zero psig. The Reactor Vessel (RV) water temperature was approximately 91 degrees Fahrenheit. There was no movement of a fuel cask or irradiated fuel. The Residual Heat Removal (RHR) System Loop 'A' was in service in the Shutdown Cooling (SDC) mode.
- o The 345 kV switchyard ring bus was energized via transmission lines 342 and 355. Air circuit breakers 102, 103, 104 and 105 were closed. Bus B6 was being powered from Bus B1. 4160 VAC buses that were in service were energized via the SUT. The Shutdown Transformer was in standby service.
- o The Emergency Diesel Generators (EDGs) 'A' and 'B' were in standby service. The APDS was energized by preferred offsite power via the SUT. The 23 kV distribution system was energized.

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- o The Primary Containment Integrated Leak Rate Test (ILRT) was in progress and Procedure 3.M.3-39 (Rev. 14) "Turbine/Generator Calibration of Relays, Lockout Test and Associated Annunciator Verification", was being performed concurrently.
- o The RV was vented to the Drywell via RV-203-4B flange (valve removed for ILRT).

Located at the end of this report is a Figure that depicts a simplified single line diagram of a portion of the APDS.

#### EVENT DESCRIPTION

On May 19, 1993, at 1328 hours, the Start Up Transformer became de-energized. The SUT became de-energized because the SUT lockout relay 86X/ST was actuated instead of the Main Transformer lockout relay 86X/MT, which caused ACB 102 and ACB 103 to trip open and eliminate line 355 and line 342 as sources of preferred off-site power to the SUT. The loss of sources of power to the SUT resulted in the following:

- o The APDS, energized by preferred off-site power via the SUT, became

de-energized and resulted in the following:

- o De-energizing/actuation of the RPS, PCIS and RBIS that included:

- o Multiple concurrent RPS scram signals. The control rod drives remained in the inserted position.

- o PCIS (Group 1) actuation resulted. The Main Steam Isolation Valves (MSIVs) and Main Steam drain isolation valves, closed for ILRT, remained closed.

- o The Group 2 valves, except for AO-5035 A/B that were jumpered open for ILRT, were closed and remained closed.

- o The Group 3 valves MO-1001-47 and -50 that were open and jumpered for ILRT remained open. Valve MO-1001-29A, open for Residual Heat Removal/Shutdown Cooling, remained open because MO-1001-47 and -50 remained open.

- o The Group 6 valves MO-1201-2, -5, and -80, closed for ILRT, remained closed.

- o RBIS actuation that resulted in the automatic closing of the inboard and outboard Reactor Building/SCS ventilation supply and exhaust dampers and automatic start of the SGTS Trains 'A' and 'B'.

- o EDGs 'A' and 'B' started automatically and re-energized Buses A5 and A6 and related AC powered load center buses, motor control centers, and distribution panels.

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After initial investigation, Bus A5 was loaded on the SUT at 1405 hours. RHR System Loop 'A' was returned to service for Shut Down Cooling at 1412 hours. Bus A6 was loaded on the SUT at 1421 hours.

Problem Report 93.9260 was written to document the event. The NRC Operations Center was notified in accordance with 10 CFR 50.72 on May 19, 1993, at 1508 hours.

#### CAUSE

A critique of the event was conducted on May 19, 1993, and was attended by applicable personnel including the Electric Lab engineer who was one

of three individuals involved in performing the test.

The root cause of the event was utility non-licensed Electric Lab engineer error. The engineer mistakenly actuated SUT lockout relay 86X/ST instead of Main Transformer lockout relay 86X/MT. The error occurred at Step 12 (b)! of Procedure 3.M.3-39 (Rev. 14), Attachment 1, "Calibration of Turbine/Generator Relays, Lockout Test and Associated Annunciator Verification".

A factor contributing to the error was that the rear board sections for the Main Transformer and SUT are mirror images of each other and are physically mounted back-to-back, with a working aisle separating the two. The manual actuation of relay 86X/ST was performed at the rear of the relay panel. In addition, the lockout relays were individually labeled only as 86X at the rear of their respective panels.

#### CORRECTIVE ACTION

Immediate corrective action taken included terminating the performance of Procedure 3.M.3-39 and stabilizing plant conditions in accordance with Procedure 2.4.16 (Rev. 11), "Distribution Alignment Electrical System Malfunctions".

#### PREVENTIVE ACTION

An immediate discussion was conducted with Electric Lab personnel on attention to detail and self-checking. The discussions were completed prior to recommencing the performance of Procedure 3.M.3-39 on May 19, 1993.

Procedure 3.M.3-39 "Turbine/Generator Calibration of Relays, Lockout Test and Associated Annunciator Verification", will be reviewed for improvement to preclude recurrence. The focus of the review is to perform the applicable procedural steps from the front of the panel.

The rear of the Main Transformer and SUT board sections will have their labeling enhanced to make the two relays (86X/MT and 86X/ST) more distinguishable from one another.

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#### DISCIPLINARY ACTION

The Electric Lab engineer involved received a written reprimand identifying the apparent cause of the incident and informing the engineer that any further problems would result in more severe disciplinary

action.

## SAFETY CONSEQUENCES

This event posed no threat to the public health and safety.

There were no component or system failures that caused or resulted from this event.

The Standby AC Power (4160 VAC) System consists of EDGs 'A' and 'B' that are self-contained and independent of the off-site power sources. The safety objective of the Standby AC Power System is to provide a single failure proof source of onsite AC power adequate for the safe shutdown of the reactor following abnormal operational transients and postulated accidents. A loss of all off-site power is described in the UFSAR Chapter 14. The Chapter 14 analysis bounds the analyses in the UFSAR Appendix R that includes a loss of all off-site power to station auxiliaries. The EDGs started and provided power to Buses A5 and A6 and the related electrical system in response to the loss of power to Bus A5 and Bus A6.

The RHRS/SDC mode of operation has a power generation design basis only. The SDC mode of operation functions to reduce the RV water temperature to 125 degrees Fahrenheit approximately 20 hours after a shutdown for refueling or servicing activities.

If the actuation had occurred when the decay heat generation rate was greater, a gradual increase in the RV water temperature could have occurred. However, alternate means for heat removal are available and described in procedure 2.4.25, "Loss of Shutdown Cooling", including methods for feed and letdown using the Condensate System, RWCU System, and the Main Condenser.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) because the automatic actuation of EDG 'A' and 'B' was not planned.

## SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review focused on LERs submitted in accordance with 10 CFR 50.73 (a)(2)(iv) involving automatic actuation of the Emergency Diesel Generators due to personnel error. The review identified related instances reported in LERs 50-293/84-01200, 84-017-00 and 92-011-00.

For LER 84-012-00, while shut down for refueling, the EDG 'B' was inadvertently started during Procedure 8.M.2-2.10.1-8 "Logic System Functional Test of the 'A' Core Spray System High Drywell Pressure Auto Initiation Trip". The event occurred when a non-licensed I&C Technician inadvertently actuated relays 14A-K5B and 14A-K6B simultaneously. These two relays are located side by side in Panel 933. This action completed the logic required to start EDG 'B'. Corrective action included counselling the non-licensed I&C Technician on attention to detail.

For LER 84-017-00, while shut down for refueling, a temporary loss of off-site power was experienced. Both emergency diesels automatically started and picked up the emergency buses as required. The event occurred after a test of the turbine trip to 345 kV breaker trip logic. Cause was determined to be utility non-licensed personnel error. The error which occurred when two stuck breaker protection switches were activated without first resetting the corresponding stuck breaker lockout relays. Corrective action included counselling of personnel to prevent recurrence.

For LER 92-011-00, while operating at 100 percent power, an unplanned actuation of a portion of the RHR System logic circuitry occurred during a functional test of the HPCI System logic circuitry. Emergency Diesel Generator 'B' started but did not load onto the respective 4160 VAC bus because the bus remained energized from the UAT. Cause of the event was utility non-licensed I&C Technician error. The error occurred when The RHR System Channel 'B' relay 10A-K10B was actuated instead of relay 10A-K8B. Corrective action included counselling the responsible I&C Technician and revising Procedure 8.M.22.10.4-2 to preclude recurrence.

## ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

### COMPONENTS CODES

Circuit Breakers (ACB-102 & 103), AC 52  
Transformer (SUT) XFMR  
Relay, Locking-Out (86X/MT, 86X/ST) 86

### SYSTEMS

Containment Isolation Control System (PCIS/RBIS) JM  
Engineered Safety Features Actuation System (PCIS,RBIS,RPS) JE  
Emergency On-site Power Supply System (EDG 'A' & 'B') EK  
Medium-Voltage Power System 4.16 KV EA

Plant Protection System (RPS)  
JC  
Reactor Water Cleanup (RWCU) System CE  
Residual Heat Removal (RHR) System BO  
Standby Gas Treatment System (SGTS) BH  
Switchyard System FK

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Figure omitted.

ATTACHMENT 1 TO 9306280072 PAGE 1 OF 1

10 CFR 50.73

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June 18, 1993  
BEC0 Ltr. 93-75

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Docket No. 50-293  
License No. DPR-35

The enclosed Licensee Event Report (LER) 93-010-00, "Start Up Transformer Became De-energized During Testing While Shut Down", is submitted in accordance with 10 CFR Part 50.73.

Please do not hesitate to contact me if there are any questions regarding this report.

E. T. Boulette, PhD

RAG/bal

Enclosure: LER 93-010-00



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Standard BECo LER Distribution

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